ORIGINAL

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of:

Petition of the Intelligent Transportation Society of America for Amendment of the Commission's Rules To Add Intelligent Transportation Services (ITS) as a New Mobile Service With Co-Primary Status in the 5.850 to 5.925 GHz Band	)	RM - 9096

Reply Comments of Amtech Corporation

Amtech Corporation submits its reply comments in support of those comments that urge the Commission to move forward with the requested allocation of 5.850 - 5.925 GHz on a co-primary basis for Intelligent Transportation Services. This effort, however, should not be construed to affect adversely the enormous investment and continued development of such services in the 902 - 928 MHz band under the Location and Monitoring Service.

Background

Founded in 1984 , Amtech Corporation with headquarters in Dallas and manufacturing and research facilities in Albuquerque, pioneered the development of intelligent transportation technology. Amtech scientists and engineers refined and then introduced the commercial application of modulated backscatter technology developed at the Los Alamos National Laboratory. Today, Amtech's modulated backscatter technology makes electronic toll collection and traffic management possible, provides container tracking for intermodal shipping, helps railroads manage rolling stock, offers commercial vehicle operators time and money saving

vehicle identification and access control, and improves efficiency in a host of related applications. In serving these applications, Amtech provides equipment that functions compatibly with numerous national and international standards that specify systems used to facilitate the efficient movement of people, goods, and services.[1]

In the United States, nearly 900,000 vehicles are equipped with Amtech tags for use in electronic toll collection operating in the 902 - 928 MHz band. These systems serve over 1200 toll lanes. Soon, the numbers will increase notably as Florida adds 455 lanes to serve an estimated 327,000 tag-equipped vehicles. Amtech technology is used on the Dallas North Tollway, the Houston area tollways, the Georgia 400, the Oklahoma Turnpike, the Kansas Turnpike, the New Orleans Crescent Connection and at some fifteen major airports including Dallas-Ft.Worth, Denver International and Los Angeles International. Every railroad car in North America used in inter-line service is equipped with two Amtech tags. Overseas, railroads in Australia, Belgium, China, France, Germany, Japan, Sweden, Switzerland, and the United Kingdom use Amtech technology. Cargo containers used in intermodal (air-sea-land) shipping are now often equipped with Amtech tags so that their movement from one location to another may be recorded efficiently.

In short, Amtech has helped to usher in the era of intelligent transportation systems. Amtech intends to continue to play a major role in the development and supply of such systems

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[1] These standards include the California Department of Transportation compatibility specifications for automatic vehicle identification, the Association of American Railroads S-918 standard for automatic equipment identification, ANSI MH5.1.9 standard for identification of freight containers, ISO standard 10374.2 for intermodal freight containers, the American Trucking Associations standards for automatic equipment identification, the International Air Transport Association Recommended Practice #1620, the Union Internationale des Chemins de Fer standard for European rail transport equipment, and the Comit9 Europ9en de Normalisation EN 10374 for automatic container identification.

both in the United States and abroad. For these reasons, Amtech is vitally interested in the Petition for Rulemaking filed by the Intelligent Transportation Society of America (ITSA) and the comments submitted in response to it.

The Commission Should Move Forward With the Requested Allocation.

The ITSA Petition sets forth in detail the arguments that undergird its request for the allocation of spectrum at 5.850 - 5.925 GHz for intelligent transportation applications. While great progress continues to be made in the development of intelligent transportation services in the 902 - 928 MHz band under the Location and Monitoring Service, ITSA correctly recognized that not all future intelligent transportation applications can be met in the 902 - 928 MHz band. The 5.850 - 5.925 MHz band can serve as a viable spectrum home for future applications, particularly those with spectrum needs that will require more bandwidth than is available in the 902 - 928 MHz band.

The new allocation will also offer American companies additional opportunities to develop technology that, with some modifications, may be suitable for export. Thus, there may be opportunities for companies such as Amtech to produce systems in the 5.850 - 5.925 GHz band for U.S. use and then build systems in other nearby 5 GHz bands for export. In a similar vein, the requested allocation could open the door to foreign providers that will leverage their experience in other portions of the 5 GHz band as they offer product for the U.S. market.[2]

[2] *See, e.g.* Comments of SAAB.

The 902 - 928 MHz Band Should Continue to be Supported.

Various comments point out that the public has made and needs to continue to make tremendous investments in systems that operate in the 902 - 928 MHz band.[3] Despite the increasing use of this band for a variety of applications, the intelligent transportation systems that have been deployed continue to operate efficiently without serious interference. Indeed, there are certain technical advantages to the use of the 902 - 928 MHz band as compared to the 5.8 GHz band including less path loss and less severe multipath nulls. According to one equipment developer, there will also be a need to increase receiver sensitivity at 5.8 and components such as filters, mixers, and amplifiers will be more costly.[4]

Even with the 5.850 - 5.925 GHz band, there will be transportation related applications that will stay in the 902 - 928 MHz band including certain uses in the railroad, access control, aviation, intermodal transportation, process control, and parcel delivery tracking fields. Thus, while the 5.850 - 5.925 GHz band holds great promise, the 902 - 928 MHz band has served the public well and can continue to do so in parallel with the development of technologies that utilize the 5.850 - 5.925 GHz band.

Toll authorities use Amtech 902 - 928 MHz systems for highways traversing thousands of miles in the U.S. to the benefit of hundreds of thousands of motorists. Additional users employ Amtech technology to pay tolls automatically at bridges and tunnels. Altogether, tens of

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[3] *See, e.g.,* Comments of U.S. Department of Transportation; International Bridge, Tunnel and Turnpike Association; and Mark IV Industries, Ltd., I.V.H.S. Division.

[4] *Id.* at Attachment A.

millions of dollars have been invested in the infrastructure needed to support electronic toll collection using Amtech technology. Additional millions have gone into other 902 - 928 MHz based toll collection systems. This investment has spurred public use of these transportation facilities. At the same time, electronic toll collection has increased the efficiency of such operations saving the users and the maintainers time and money while resulting in energy savings and less air pollution.

Railroads make extensive use of the 902 - 928 MHz band throughout the United States, Canada, and Mexico. As noted above, virtually every piece of rolling stock employed by North American railroads carries two tags designed to communicate with a modulated backscatter reader. These readers operate in the 902 - 928 MHz band. Consequently, there are some 1.4 million rail cars and locomotives equipped with such tags in North America. These tags allow the railroads to track the locations of cars as they pass readers and to associate with the tags important information concerning the identity and treatment of cargo. These systems also support the efficient routing and the maintenance of rail cars and locomotives.

The trucking industry uses automatic equipment identification made possible by short-range systems in the 902 - 928 MHz band to facilitate vehicle regulation at points-of-entry, weigh stations, and checkpoints. Such systems enhance safety by providing a ready means for communicating information concerning the identity of hazardous cargo. These applications also save time and money by reliably recording the identity of vehicles with virtually no delay.

Both private and commercial vehicles now use systems in the 902 - 928 MHz band for access control at gated entrances. This application not only minimizes delay, it improves safety by limiting access only to authorized vehicles.

As noted above, the current LMS band of 902 - 928 MHz already provides spectrum support for a host of worthy intelligent transportation system applications. Amtech submits that the 902 - 928 MHz band should continue to be used in support of such applications. While not all of the applications suggested by ITSA could be carried out in the 902 - 928 MHz band, this spectrum has proven to be remarkably versatile. Additionally, despite years of regulatory turmoil in the proceeding that led to the creation of the Location and Monitoring Service, those users that depend on the 902 - 928 MHz band have found it to be a reliable spectrum home for their critical transportation related systems.[5]

The Commission should not signal any intent to abandon the 902 - 928 MHz band as it moves forward with the development of an allocation at 5.850 - 5.925 GHz. The public's investment in the current LMS spectrum is simply too great for any prudent decision to contemplate such a move.

[5]The Commission long considered use of the 902 - 928 MHz band in adopting regulations in the protracted LMS proceeding in PR Docket 93-61, which struck a balance among various users of the band. Contrary to the implication of the ITSA Petition at 44, non-multilateration systems operating in the 902 - 928 MHz band may lawfully provide "in-vehicle signing" by transmitting information to vehicles in the form of brief messages, provided that the messages are transportation related. Thus, the messaging prohibition goes to general messaging. It does not go to instructional messages and the like "so long as they are related to the location or monitoring functions of the system." 47 CFR § 90.353(b). The prohibition on messaging is designed to prevent the band from being used as simply another spectrum resource for general messaging. Report and Order, PR Docket No. 93-61,10 FCC Rcd 4696, 4709 (1995); *recon. in part,* 11 FCC Rcd 16906 (1996).

The Commission Should Move Ahead with the Allocation of spectrum at 5.850 - 5.925 GHz While Encouraging the Development of System Standards.

The comments in this proceeding reveal that it is too early to propose rules that incorporate specific system characteristics beyond those needed to define the basic allocation. As the standards development proceeds, however, the FCC should move forward with proposing the allocation.[6]

In the study prepared by ARINC that accompanied the ITSA Petition various approaches to intelligent transportation systems were described. These include backscatter and non-backscatter. Each offers tradeoffs.

Backscatter systems generally allow for lower tag costs because of the simple circuitry that is placed into the tag. A backscatter tag contains circuitry that modulates the signal striking the tag so that the reflected (backscattered) signal can be received by a reader and then decoded. Backscatter tags do not contain a transmitter. In many cases these tags rely on the incident signal as a source of electric power and, thus, operate without a battery. Tags of this kind usually outlast the vehicle to which they are affixed.[7] Frequency agility can be accomplished easily over a broad range using backscatter systems because tags can be made to respond over many MHz of spectrum.[8] On the other hand, tags that contain active transmitters for responding to signals from readers can usually operate over longer distances. Tag battery life in such systems, however, poses an expense because the tags actually generate a signal that is transmitted. Battery disposal

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[6] Unlike Mark IV, Amtech urges the Commission not to initiate an inquiry proceeding, which would be likely to slow down progress on the development of new services at 5.850 - 5.925 GHz, but to move forward with a two stage rule making. The first stage would create the basic allocation. The second stage would focus on service rules.

[7] Some backscatter tags employ long life batteries to power the circuitry in the tag.

[8] For example, Amtech backscatter tags that operate in the U.S. in the 902 - 928 MHz band are usable throughout that band.

also raises an environmental challenge. Systems of this kind usually do not have the same degree of frequency agility to allow the tag to function with readers operating on any frequency in the band.

Different applications may call for different technologies as the technology is matched to the need. The factors that affect the choice of technology for intelligent transportation applications will be sorted out in the standards development process. At this time, the Commission should not preclude any technology. Thus, the allocation process should proceed with the understanding that system operating criteria will continue to be refined. Broad limits on out-of band emissions should be proposed to establish the allocation. Service rules, however, should come later as standards for 5.8 GHz systems mature. When service rules are developed, they should recognize the inherent need for flexibility and view "transportation" very broadly in order to accommodate clearly those services that are related to transportation including cashless transactions for food and fuel.

The service rules in the new band should also provide greater technical flexibility as to power and height so as to accommodate easily highway situations such as elevated roadways and bridges that may require higher antenna sites than was contemplated in the rules adopted for 902 - 928 MHz. In addition, the Commission should consider how a limited amount of the new spectrum could be employed on an uncoordinated non-exclusive basis for use without individual station licenses in order to address a variety of transportation needs including portable tag readers and readers mounted in vehicles to identify passive electronic landmarks such as street intersections and house numbers embedded into tags. Systems using such technologies can increase driver safety and improve the response times of emergency services.

At this point in time intelligent transportation system operational needs are still being defined.[9] Nationwide standards may prove desirable for certain uses, but not for all. Even in an environment supported by nationwide standards, the new allocation (like the 902 - 928 MHz band) will need to support various applications, which will likely have differing operational characteristics but which will share the need for a direct short range communications system. There may be applications in which international standards are highly desirable either to facilitate trade or interoperability.[10] While standards can lower costs and facilitate interoperability, the early freezing of standards can saddle the public with sub-optimum solutions.[11] As the FCC moves forward with the development of the radio service envisioned by the ITSA Petition, the agency should be careful not to stifle innovation at the starting gate by becoming too embroiled in the standards debate.

Undoubtedly, there will be a need for field testing of various systems as standards development proceeds. The Commission should encourage such efforts. It should also seek to foster an environment in which the standards setting roles of the various stakeholders are recognized and accommodated in the new band. The applications that will fall under the rubric of intelligent transportation systems are too numerous to become the sole province of any one agency or industry. At the same time, those who seek to support intelligent transportation

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[9] ITSA Petition at 52 - 54; U.S. Department of Transportation Comments at 3.

[10] For example, the Comit9 Europ9en de Normalisation (CEN) through CEN TC-278 has been working for several years on highway applications standards and has recently completed work that will now be considered by the International Standards Organization TC-204.

[11] Work is now underway in U.S. standards development that will build on the experience of existing transportation users of dedicated short range communications systems and lead to the ability to use both backscatter and active transmitter technologies in the same spectrum. Similarly, much of the standards development work in the 902 - 928 MHz band has been undertaken with the anticipation that eventually there also will be a complementary band at 5.8 GHz.

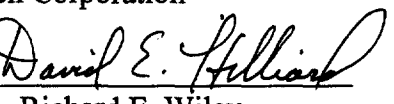
systems, including the companies that will design and build the hardware, need some assurance that their markets will not be in a permanent state of disruption due to regulatory proceedings that will deter the implementation of systems while the rules for the ultimate system are being developed.

Conclusion

Amtech joins with those who urge the Commission to move forward with the creation of the allocation at 5.850 - 5.925 GHz in support of intelligent transportation systems. Efforts to create the allocation should proceed in parallel with standards development for 5.850 - 5.925 GHz as an additional spectrum resource needed to support a host of worthwhile intelligent transportation applications. At the same time, the Commission should recognize the enormous investment that public and private entities have made in systems designed to function in the 902 - 928 MHz band and refrain from actions that would imperil this investment.

Respectfully submitted,

Amtech Corporation

By 

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Certificate of Service

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